



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/624,338

07/22/2003

Clayton M. Grondahl

GRON-0002

6985

23550 7590 01/16/2007
HOFFMAN WARNICK & D'ALESSANDRO, LLC
75 STATE STREET
14TH FLOOR
ALBANY, NY 12207

EXAMINER

KYLE, MICHAEL J

ART UNIT

PAPER NUMBER

3677

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

01/16/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/624,338

Applicant(s)

GRONDAHL, CLAYTON M.

Examiner

Michael J. Kyle

Art Unit

3677

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-10,16-20,23,24 and 26 is/are rejected.
- 7) ☒ Claim(s) 3-5,11-15,21 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 1, 9, 24, and 26 are objected to because of the limitations regarding the longitudinal and radial axes of the component to be sealed against. It is unclear if applicant is attempting to claim the component in combination with the seal. As presented, only the seal is claimed (based on the preamble). If only the seal is to be claimed, references to other components that are not part of the invention should be prefaced by "adapted to" or "for" language.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 8, 9, 10, 16, 17, 19, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gail et al ("Gail", U.S. Patent No. 6,352,263) in view of Webster et al ("Webster", U.S. Patent No. 6,220,602). With respect to claims 1, 8-10, 19, and 23, Gail discloses a seal assembly comprising a brush seal (7) with a plurality of staggered seal members, and a support (9) coupled to the seal, having a portion facing the high pressure side of the seal. A free portion of the seal (at end 7) is angled relative to a longitudinal axis and all radial axes of a component to be sealed against ("approximately 90" degrees, column 4, line 6, includes a range of angles that are not 90 degrees, and thus angled with respect to a radial direction) and contacts

Art Unit: 3677

a distal end in the pressurized operative state (abstract), and is out of contact in an unpressurized inoperative state (leaving a gap, as discussed in abstract). The seal has a fixed portion (6) that is angled relative to free portion (7) in both operative and inoperative states and is substantially parallel to the a longitudinal axis of a component to be sealed against. The seal is used in a rotary machine. Gail further discloses the fixed portion is positioned substantially perpendicular to a longitudinal axis of a component to be sealed (see figure 3), and the free portion is angled out of plane. Gail discloses the seal to be brush seal, not a leaf seal as claimed.

4. Webster teaches a seal arrangement where either a brush seal or leaf seal may be used (column 7, lines 44, 45), thereby establishing the seals as equivalent. It would have been obvious to one having ordinary skill in the art at the time of the invention to use either a brush seal or leaf seal, as Webster teaches these seals to be equivalent and interchangeable.

5. With respect to claims 16 and 17, the combination of Gail and Webster teaches the fixed portion (6) to be provided by an arcuate member in each leaf seal member. Examiner notes that because the seal extends around a rotary shaft, it is essentially circular, which will include arced portions. Gail shows the free end portion to be circumferentially parallel to a surface of the rotatable component.

6. Claims 2, 18, 20, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gail in view of Webster as applied to claims 1, 9, and 19 above, and further in view of Halowach et al ("Halowach", U.S. Patent No. 4,813,608). Gail and Webster fail to disclose the leaf seal layers to be made from different materials, where a first material addresses a high pressure side

Art Unit: 3677

of the seal and a second material addresses a low pressure side of the seal, where the material has a lower coefficient of thermal expansion than the second material.

10. Halowach discloses a leaf seal assembly (40) comprising two layers of different material with different coefficients of thermal expansion. The two layers are bonded together, such that the different rate of expansion between the two layers causes the seal to bend in a preferred direction, which results in the formation of a tight air seal between adjoining structures (column 2, lines 13-24). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Gail and Webster as taught by Halowach, such that the layers are made of materials with different coefficients of thermal expansion, so that the differing rates of expansion causes the seal to bend, forming a tight air seal between the structures.

7. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gail in view of Webster as applied to claim 1 above, and further in view of Mackay et al ("Mackay", U.S. Patent No. 5,042,823). Gail and Webster fail to disclose the plurality of staggered leaf seal members (3, 4) to be provided by a single strip of material.

8. Mackay teaches a leaf seal arrangement (54) made from single strip of material. Manufacturing a multi-layered seal from a single strip of material lowers manufacturing costs because the seal can then be assembled in a simpler fashion, as opposed to cutting two different layers to length and connecting the layers together to form the seal. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Gail and Webster as taught by Mackay, such that the seal is made from a single strip of material, in order to reduce manufacturing costs. Mackay further discloses the leaf seal members to be fixed by a weld.

Art Unit: 3677

9. With respect to claim 24, Gail discloses a method of fabricating a seal assembly comprising the steps of forming a frustoconical brush seal member (1) with a fixed portion (6) angled relative to a free portion (7) in operative and inoperative states. Examiner notes the Gail discloses the angle between portions (6) and (7) to be “approximately” ninety degrees (column 4, lines 6). Because this is an “approximate” angle, it includes angles that are not ninety degrees, which would provide a frustoconical shape. Also, for this reason, the free portion is angled relative to both a longitudinal axis and all radial axes of a component to be sealed against. The brush seal is coupled to a support (9), such that the free portion (7) contacts a distal end of the support portion (11) in an operative state, and is out of contact with the distal end in the inoperative state (separated by gap 12). Gail only discusses the use of a brush seal, not a leaf seal as claimed.

10. Webster teaches a seal arrangement where either brush seal or leaf seal may be used (column 7, lines 44, 45), thereby establishing the seals as equivalent. It would have been obvious to one having ordinary skill in the art at the time of the invention to use either a brush seal or leaf seal, as Webster teaches these seals to be equivalent and interchangeable.

Allowable Subject Matter

11. Claims 3-5, 11-15, 21, and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Art Unit: 3677

12. Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection. Rejections are now based on Gail, rather than Mayr.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Kyle whose telephone number is 571-272-7057. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

14. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Swann can be reached on 571-272-7075. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

mk


Chuck Y. Mah
Primary Examiner